Klein + Hummel

Portable active loudspeaker

freePORT PAS 400

Installation & Operation Manual

058-E0146
Version 060328

Content

Safety Instructions

It is absolutely essential that you read these safety instructions carefully before connecting and using this K+H product. Your safety depends on it. Furthermore, failure to follow these instructions voids the warranty.

To ensure safe operation for years to come, keep these instructions in a safe place for future reference. K+H has manufactured this product in accordance with IEC 92 (SEC) 39 standards, then tested and delivered it in safe operating condition. To maintain it in this condition, you must:

- observe all safety instructions
- use the product only as described herein
- have any maintenance, repairs, or modifications performed only by K+H or other authorized personnel
- ensure that the room in which you use this product is wired in accordance with the local electrical code

Warning!

When the interior of the cabinet is exposed, touching some parts can lead to an electric shock.

If you need to gain access to the interior electronics of the unit, always disconnect the unit from any and all power sources first.

Any repairs, maintenance, or other service of the unit when its interior compartment is exposed may only be performed safely (in accordance with VBG 4) by authorized technicians familiar with all the risks involved. Even in an unplugged state, a fully charged capacitor in the unit can zap the unsuspecting.

Loudspeaker output jacks labelled with the IEC 417/5036 emblem (Fig. A) may be carrying dangerously high voltages. If your unit has this emblem, ensure that any connections to be made between these jacks and the speakers themselves are made before powering up the unit, and are done so only with manufacturer-approved interconnecting cables.

Warning!

If you need to replace any fuses, ensure that the replacements are of exactly the same type, value and voltage as the originals, as spelled out in the technical specifications at the rear of this manual.

Do not use "repaired" fuses.

If you do not have fuses of the specified size, type and value, do not hot-wire the contacts in the holder by short-circuiting them.

Certain areas of the cabinet, cover, and rear panel can achieve extreme temperatures and are therefore marked with a "HOT" label (Fig. B). Refrain from touching any heat sink or ventilation grille.

High volume levels are known to cause permanent - i.e. irreversible - hearing damage, especially when listened to without sufficient breaks. The higher the levels, the more frequent and extended must be the breaks. Avoid standing too close to loudspeakers that are being driven at high levels. If you must be exposed to high sound pressure levels over an extended period of time, use hearing protection.

Mains Connection:

- This unit is designed for continuous operation.
- Ensure that the operating voltage of the unit matches that of the local mains current (AC line voltage).

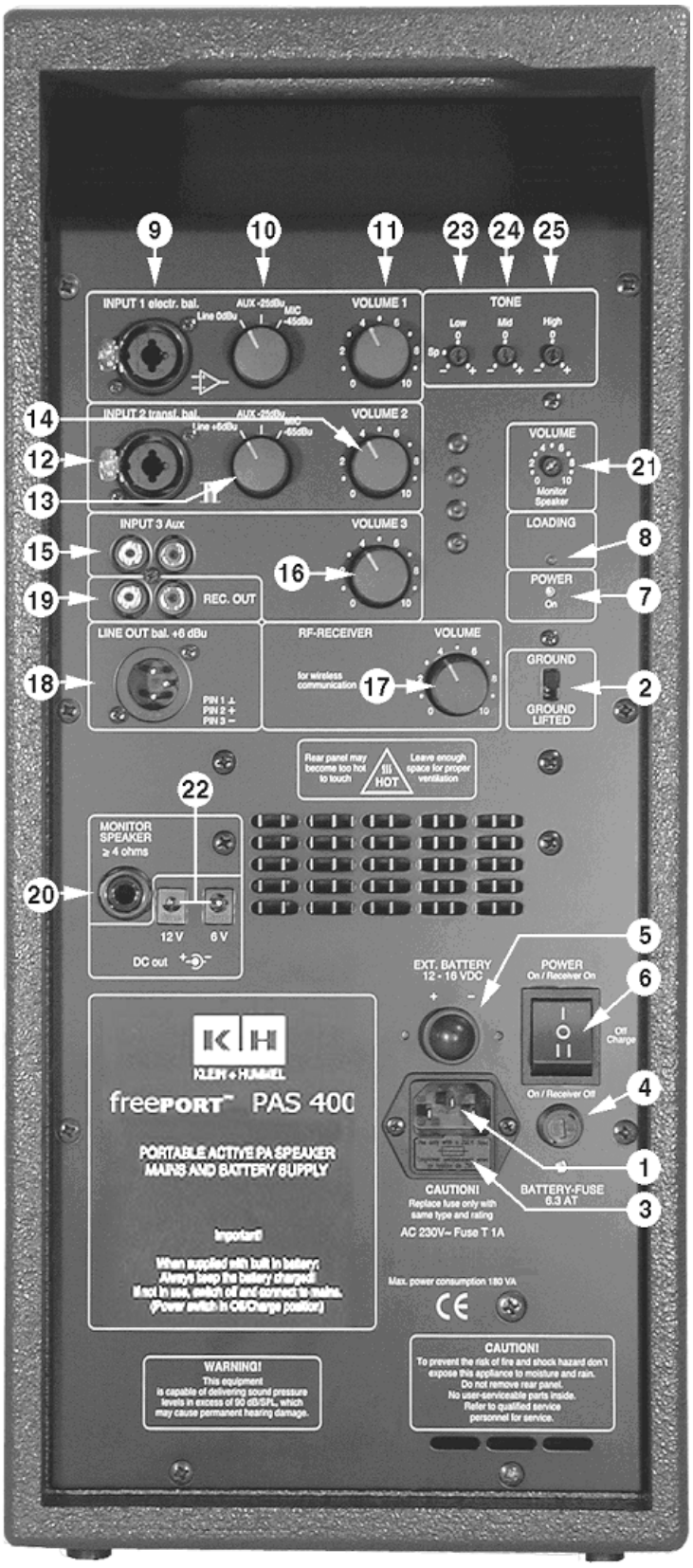
- Always check before connecting the power cable to the mains socket that the power switch on the unit itself is set to off (''O'').
- Use the power cable or power supply that came with the unit to connect to the mains socket (wall outlet).
- Power supply: a damaged power cable may not be repaired. Use a new cable.
- Avoid plugging the mains cable into a power strip that already has several other power-consuming devices connected to it.
- Avoid using extension cables. The unit must be connected to a mains socket close to it, and that socket should be freely accessible.

Installation:

- This product may only be placed on a stable, clean, horizontal surface.
- Do not expose this product to vibration.
- Do not operate this product anywhere near water or other liquids. Do not use it near a sink, swimming pool, bathtub, or in any damp room or area. Electrical shocks carried through water can kill. Do not place any beverages whatsoever on or near this product, as liquids can kill electronic components.
- Ensure sufficient ventilation around the product to allow for adequate heat dissipation, especially near the rear panel and the sides of the cabinet (minimum of 8 inches from the nearest wall). The unit may only be installed in a rack if measures are taken to ensure sufficient ventilation and if the mounting instructions of the manufacturer are followed. Do not block or cover any heat sink, fan, or vent.
- Do not place the product where it will be in the path of direct sunlight, and keep it a safe distance away from radiators and other heaters of any kind.
- If you bring this product from a cold environment into a warm one (such as from a vehicle into a studio), it is quite possible that condensation will form inside the cabinet. Please allow the unit sufficient time for acclimation to room temperature (minimum thirty minutes) before connecting and powering up.
- To avoid accidents, do not use any accessory equipment with this product that is not approved by the manufacturer, particularly mounting accessories.
- Do not place this unit on any unstable platform, cart, stand or table. If the unit falls, it can cause bodily injury to persons, or can be damaged itself.
- To protect this product from lightning damage during a thunderstorm or from power surges during an extended absence, disconnect the power cable from the wall outlet.

freePORT PAS 400

Rear Panel View



Numbered items correspond to explanations in the text

1 Installation & Set-up

1.1 Safety Precautions

Note!
Please read and follow all of the safety precautions in this manual! It is absolutely essential that you read these safety instructions carefully before connecting and using this product. Your safety depends on it. Furthermore, failure to follow these instructions voids the warranty.

To ensure safe operation for many years, keep these instructions in a safe place for future reference. K+H has manufactured this product in accordance with IEC 92 (SEC) 39 standards, then tested and delivered it in a safe operating condition. To maintain it in this condition, you must:

- observe all safety instructions,
- use the product only as described herein
- have any maintenance, repairs, or modifications performed only by K+H or its authorized agents
- ensure that the room in which the product is used is wired in accordance with local electrical codes

If the loudspeaker will be installed in an area where people could go underneath it, then it should be secured with an additional safety cable, which can be attached to the carrying handles!

1.2 Deliverables

- 1 freePORT PAS 400 active PA loudspeaker system
- 1 power supply cable
- 1 Installation & Operation Manual

1.3 Operating Conditions

The temperature limits for the freePORT PAS 400 active PA loudspeaker system are as follows:

Operating Temperature:

+14 to +104 °F (-10 to +40 °C)

Storage or Transportation Temperature:

+5 to +104 °F (-15 to +40 °C)

If the temperature of the loudspeaker falls below 5 °F (-15 °C) at any time, the rechargeable battery may be permanently damaged.

The freePORT PAS 400 will operate in any position and under a variety of conditions. It is, however, not watertight and should only be installed or operated in dry conditions. Areas with excessive moisture, considerable dust or aggressive chemicals should also be avoided.

The freePORT PAS 400 is not for outdoor installations. Temporary outdoor usage is possible, but only within the temperature limits and in no situations where water can directly come in contact with the unit. For operation under rainy conditions, the LRH/S Rain Hood accessory must be used.

The coated loudspeaker cones can handle temporary exposure to fog but in no case can they tolerate any dew or condensation.

If a small amount of moisture or dew has formed on the cabinet or the back panel, e.g. after transportation or storage, carefully wipe off all of the moisture with a clean, soft cloth and allow the unit to acclimate in a warm, dry environment for at least two hours before applying power to the unit or operating it.

1.4 Set Up

1.4.1 Tripod or Pole Mounting

The freePORT PAS 400 enclosure is fitted, on the bottom, with a standard 35 mm mounting flange for tripod or pole mounting. It can also be mounted to the LST 60 spiked pole for outdoor use on uneven ground.

With the LH 33 tilt connector the tilt angle can be adjusted from 0° (perpendicular) to 15°.

For maximum tilt-angle adjustability, the LH 26 fork mounting bracket can be attached to the PAS 400 with 2 x M8 knurled thumbscrews and then combined with an LH 28 tripod stand adapter to mount it to a tripod. The speaker can then be rotated and tilted to the optimum angle for the listeners.

1.4.2 Wall or Ceiling Mounting

For hang-mounting, the top of the enclosure has two M8 threaded attachment points (115 mm spacing) for attaching an LH 29 TV spigot for mounting to cross beams or light stands.

For wall mounting with maximum adjustability, the speaker can be attached, via the 35 mm mounting flange on the bottom, to an LH 120 wall mount bracket. The speaker can then be rotated and tilted (10 - 25°) to the optimum angle for the listeners.

1.4.3 Positioning & Alignment

Position the loudspeakers so that they:

- will not be directly aimed at any open microphones
- will be as far away from the microphones as possible - especially important with sensitive or long-distance microphones
- will be at the front of the stage or more forward than the microphones (in relation to the listeners)

1.5 Power / Mains Connection (1)

The freePORT PAS 400 is available in the following AC mains voltage configurations:

- 230 Volt AC / 50 Hz
  (supplied with a German Schuko mains cable connector)
- 120 Volt AC / 60 HZ
  (supplied with a USA 3-prong mains cable connector)
- 100 Volt AC / 50-60 Hz
  (supplied with a USA 3-prong mains cable connector)

Attention!

Before connecting to the mains power supply:

- ▶ Verify that each PAS 400 system matches the mains voltage at the site!
- ▶ Do not disconnect any part of the ground connection! When powered from an AC mains supply, the system must only be operated with a proper ground connection!

The (supplied) mains cable connector may not match the AC outlet type in some countries. Only a qualified electrician should change the AC connector and the proper ground-connection must be made.

1.6 GROUND LIFT Switch (2)

The signal GROUND LIFT switch should be set to the GROUND position. If the PAS 400 hums when connected to other equipment, setting the switch to the GROUND LIFTED position may reduce or eliminate the hum.

1.7 Fuses (3) and (4)

Disconnect the PAS 400 from any external power supply (mains or battery) before changing or inspecting fuses.

Only the following fuse types can be used

1A Slo-Blo	for 230 Volt AC / 50 Hz models
2A Slo-Blo	for 120 Volt AC / 60 Hz
2A Slo-Blo	for 100 Volt AC / 50-60 Hz
6.3A Slo-Blo	for the rechargeable battery

1.8 Powering with a 12-16 Volt DC External or Auto Battery (5)

The "EXT BATTTERY 12 - 16 VDC" socket is accessible by removing the sealing cap.

A plug-in connector for this is socket available. Please note the correct polarity (labelled as "+" and "-" by the socket). Incorrect polarity will not cause damage, but the internal battery will then power the PAS 400.

1.9 Power Switch (6)

The power switch has three positions:

Position 0	Loudspeaker system is Off Battery will charge (if connected to a power supply)
Position I	Loudspeaker system is On Wireless receiver is On Battery will charge (if connected to a power supply)
Position II	Loudspeaker system is On Wireless receiver is Off Battery will charge (if connected to a power supply)

When the system is switched On (to Position I or Position II), there is an automatic 3-second delay before it is operational.

When the (optional) built-in wireless receiver is not being used, set the Power Switch to Position II to conserve battery power and to get the longest run-time per charge.

When switching from Position I to Position II (or visa versa), first switch to Position 0 and wait 5 seconds before switching to the next position, otherwise, the Deep Discharge Cut-Off Circuit may be activated (if activated, switch to Position 0 and wait 30 seconds before switching to Position I or II.).

If AC mains power is interrupted, the system will automatically switch over to battery power. Remote On / Off switching of the AC mains power will automatically switch the system over to battery power.

1.10 Power On Indicator (7)

The "Power On" indicator remains illuminated (green) while the loudspeaker system is On. The Power On indicator also serves as a "Remaining Charge" indicator when the rechargeable battery is powering the system:

- Slow blinking LED
  approximately 25% of battery charge remains
- Fast blinking LED
  less than 25% of battery charge remains

1.11 Battery Charging Circuit & Loading Indicator (8)

Note:
Before the system is used for the first time or if it has not been connected to AC mains power for several months, connect it to AC mains power supply (with the Power On switch in Position 0) and charge the battery for at least 6 hours.

The Loading indicator remains illuminated (red) while the battery is charging. After the battery is fully charged, the Loading indicator will be off and the built-in charging circuit will automatically switch to trickle charging. The charging circuit is completely separate from the amplifier power supply and will charge the battery from any state of charge, at a smooth, controlled rate up to a full charge. The power amplifier (when connected to AC mains) can deliver full power, even while a completely discharged battery is being charged.

Charging times (with the Power On switch in Position 0), for a completely discharged battery, are approximately as follows:

- 6 hours
  to 90% capacity
- 10 hours
  to 100% capacity

For a partially discharged battery, the charging time will be shorter.

The internal battery will not recharge when the loudspeaker is being powered by an external battery source. The built-in charger will not recharge external batteries connected to the EXT BATTERY socket.

For fastest battery recharging, set the Power On switch to Position 0 and connect the AC mains cable to an AC mains power supply.

The loudspeaker system, even with a fully charged battery, can be connected (long term) to AC mains power without damage to the battery. The system does not need to be continually connected to AC mains power when stored (see table below for remaining capacity) and may be stored for several months, although not recommended, without recharging. Battery lifetime is estimated to be approximately 3 years or approximately 5000 recharge cycles, with no memory effect.

Battery Self-Discharge During Storage, at 77 °F (25 °C):

Time since last full recharge	Remaining Capacity
3 months	91%
6 months	82%
12 months	64%

1.12 Deep Discharge Cut-Off Circuit

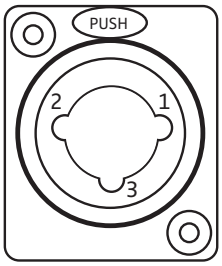
The Deep Discharge Cut-Off Circuit is an intelligent circuit that will automatically switch off the battery supply to the amplifier, before the battery voltage goes below the manufacturer's recommended discharge cut-off voltage.

▶ If this occurs, switch the loudspeaker system Off (to Position 0) and immediately recharge the battery.

1.13 Connecting Signal Sources

All inputs have at least 10 dB of headroom.

1.13.1 Input 1 and Input 2 pin connectors



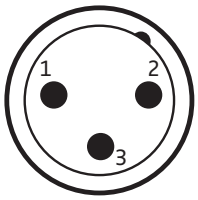
Input 1 and Input 2 are combo jacks that accept balanced or unbalanced signals from either XLR male connectors or ¼ in. phone plugs.

Input 1 and Input 2:

Pin 1	Ground
Pin 2	+ signal
Pin 3	-- signal

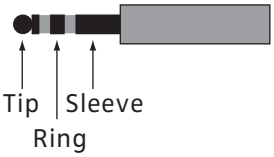
Balanced input signals - cable configurations:

Cables for balanced signals that will be connected to Input 1 or Input 2 should be configured as follows:



XLR male connector:

Pin 1	Ground (shield)
Pin 2	+ signal
Pin 3	-- signal



¼ in. TRS (stereo) phone plug:

Tip	+ signal
Ring	-- signal
Sleeve	Ground (shield)

Unbalanced input signals - cable configurations:

For unbalanced input signals, the simplest solution is to use a ¼ in. mono (TS) phone plug. Connect the "+ signal" to the Tip and the Ground (shield) to the Sleeve.

Warning!

Connect unbalanced microphones or any other equipment that has an unbalanced connector (e.g. ¼ in. mono phone plug) to INPUT 2 (unless INPUT 1 will ONLY be used in the LINE position). INPUT 1 has phantom power in the MIC or AUX positions and this may cause permanent damage to an unbalanced microphone when an unbalanced connector is used.

Connectors for unbalanced signals should be configured as follows (refer to previous Warning):

XLR male connector		¼ in. TRS (stereo) phone plug		¼ in. TS (mono) phone plug	
Pin 1	Ground (shield)	Tip	+ signal	Tip	+ signal
Pin 2	+ signal	Ring	shorted to Sleeve		
Pin 3	shorted to Pin 1	Sleeve	Ground (shield)	Sleeve	Ground (shield)

1.13.2 INPUT 1 (9)

INPUT 1 is an electrically balanced XLR / TRS combo jack (9). The input level sensitivity can be set with the 3-position selector switch (10) to:

Line	(0 dBu)
AUX	(-25 dBu)
MIC	(-45 dBu)

12 V phantom power is supplied to INPUT 1 when the input selector switch is in the MIC or AUX position. Condenser microphones (requiring phantom power) should be connected to INPUT 1.

Warning!

Connect unbalanced microphones or any other equipment that has an unbalanced connector (e.g. ¼ in. mono phone plug) to INPUT 2 (unless INPUT 1 will ONLY be used in the LINE position). INPUT 1 has phantom power in the MIC or AUX positions and this may cause permanent damage to an unbalanced microphone when an unbalanced connector is used.

The output volume can be adjusted using the VOLUME 1 control (11).

1.13.3 INPUT 2 (12)

INPUT 2 is a transformer balanced XLR / TRS combo jack (12). The input level sensitivity can be set with the 3-position selector switch (13) to::

Line	(+6dBu)
AUX	(-25 dBu)
MIC	(-65 dBu)

The MIC (-65 dBu) position is ideal for distant-miking set-ups with dynamic mics (see section 2.1). The LINE (+6 dBu) position is ideal for balanced signals from pro audio sources or feed-signals from an OB Van.

The output volume can be adjusted using the VOLUME 2 control (14).

1.13.4 INPUT 3 (15)

INPUT 3 is a pair of unbalanced RCA jacks (15). Line-level (0 dBu sensitivity) stereo signals (e.g. from a CD player, Mini Disc player, cassette player, etc.) can be connected and the left and right inputs will be summed to produce a mono signal.

The output volume can be adjusted using the VOLUME 3 control (16).

1.13.5 RF Receiver Input (17)

RF receivers (optional) for wireless microphones can be user-installed in the side compartment of the freePORT PAS 400. Please refer to the separate instructions for installation and connection of the receivers to the PAS 400. The PAS 400 can accommodate the following combinations of RF receivers:

- Up to 4 Sennheiser Evolution Bodypacks, or
- 1 Sennheiser Evolution Diversity + 2 Sennheiser Evolution Bodypacks

The individual volume controls for the Evolution Bodypacks will be accessible after they are installed, however, the volume level for the Evolution Diversity receiver has to be pre-adjusted before it is installed.

The overall output volume can be adjusted using the RF-RECEIVER VOLUME control (17), which functions as a master volume control for all of the RF receivers that are installed.

1.14 Audio and DC Outputs

1.14.1 LINE OUT (18)

LINE OUT is an electrically balanced XLR male connector (18) with the same pin configuration as shown in section 1.13.2. This line level output (+6 dBu nominal / +17 dBu peak) is a mix of all input signals connected to the PAS 400 and may be used as the input signal to other systems, (e.g. a mixing desk, another active loudspeaker).

1.14.2 REC OUT (19)

REC OUT is a pair of unbalanced RCA jacks (19). Each output has the same line-level (-6 dBu) mono signal, which is a mix of all input signals connected to the PAS 400, and may be used as the input signals to a recorder (e.g. Mini Disk, Cassette).

1.14.3 MONITOR SPEAKER (20)

MONITOR SPEAKER is a 1/4 in. phone jack with a 15-Watt RMS (at 4 Ω) output for powering additional passive loudspeakers.

This output level can be adjusted using the VOLUME Monitor Speaker (21) control.

1.14.4 DC OUT (22)

The PAS 400 has two DC Outputs (22) for powering portable CD, MD or cassette players / recorders, RF receivers, etc., that can be powered by an external DC power supply. The 12 V output is factory-set and the 6 V output is user-adjustable (internally) for either 3, 6 or 9 VDC. The DC outputs are short-circuit-proof, regulated and utilize standard barrel connectors.

Warning!

Correct polarity and voltage are both important! The PAS 400 barrel connectors are configured for the standard polarity (inner sleeve = +DC and outer sleeve = --DC) used in most portable players / recorders. First check the manufacturer's information, regarding polarity and DC voltage for external power supplies, before any units are connected to the PAS 400.

Note:
When the rechargeable battery is powering the PAS 400 and external units are also being powered by the DC outputs, the run-time will be reduced.

1.15 PDD 63 Delay Unit

The PDD63 Delay unit (optional) can be user-installed in the side compartment of the

freePORT PAS 400. Please refer to the separate instructions for installation and connection of the PDD63 to the PAS 400.

In large rooms or rooms with strong echo characteristics, a delay may be useful - even at distances less than 30 feet (9 meters). Some examples are as follows:

If the PAS 400 is used as a side-fill and is 30 feet (9 meters) or more from the FOH loudspeakers, the signal to the side-fill loudspeakers should be delayed so that the sound from all loudspeakers reaches the audience at the same time.

If the PAS 400 is 30 feet (9 meters) or more from the microphone users, the loudspeaker should be delayed so that the sound from the loudspeakers and the un-amplified voices of the microphone users reach the audience at the same time.

The PDD63 delay unit allows a delay to be set for the loudspeakers and the MONITOR SPEAKER output. The delay "time" is set as a distance in meters (1 ms = 0.343 m = 1.125 ft.) using the two easily accessible controls on the PDD63.

2 Operation

Note!
To prevent audible clicks or thumps, turn the VOLUME control (11) or (14) for INPUT 1 or 2 all the way down before:

- connecting or disconnecting microphones or signal sources
- changing the input level sensitivity with the selector switch (10) or (13).

2.1 Dynamic Microphones - Distant-Miking Set-up

If the distance from the person speaking into the mic is 8 to 20 inches (e.g. when speaking at a conference table, or making a speech from a podium), turn down VOLUME 2, connect the mic to INPUT 2 and select the MIC (-65 dBu) sensitivity. Then adjust VOLUME 2 to the desired level.

2.2 Dynamic Microphones - Close-Miking Set-up

If the mic will be used at close distances, i.e., less than 4 inches (e.g. singing, speaking close to the mic because of high background noise), turn down VOLUME 1, connect the mic to INPUT 1 and select the MIC (-45 dBu) sensitivity. Then adjust VOLUME 1 to the desired level.

Note!
INPUT 1 has phantom power (in the MIC and AUX positions) for powering condenser mics.

2.3 Electret-Condenser Microphones - Distant-Miking Set-up

If the distance from the person speaking into the mic is 8 to 20 inches (e.g. when speaking at a conference table, or making a speech from a podium), turn down VOLUME 1, connect the mic to INPUT 1 and select the MIC (-45 dBu) sensitivity. Then adjust VOLUME 1 to the desired level.

2.4 Electret-Condenser Microphones - Close-Miking Set-up

If the mic will be used at close distances, i.e., less than 4 inches (e.g. singing, speaking close to the mic because of high background noise), turn down the VOLUME (1 or 2), connect the mic to the INPUT (1 or 2) and select the AUX (-25 dBu) sensitivity. Then adjust the VOLUME (1 or 2) to the desired level.

2.5 Mixing Console or Line-Level Inputs

Line level inputs can be connected to INPUT 1 (electrically balanced with 0 dBu sensitivity) or INPUT 2 (transformer balanced with +6 dBu sensitivity). These inputs have the same audio quality, but INPUT 2 may be more immune to hum or noise because it is transformer balanced and completely isolated form the mains ground.

2.6 Recording from the PAS 400

An analog recorder (e.g. Mini Disc, cassette, etc.) can be connected to the REC OUT outputs and a 2-channel mono recording of all inputs connected to the PAS 400 can be made. If the outputs of the recorder are also connected to INPUT 3 (e.g. for playback), then turn down VOLUME 3 before making any connections. Turn the volume level up slowly to prevent feedback (many recorders produce an output signal, for monitoring, while they are recording

- which may cause loop feedback when the recorders inputs and outputs are connected to the same unit).

2.7 TONE Controls

The PAS 400 features three tone controls for separate adjustment of the Low (Bass), Mid (Middle) and High (Treble) frequencies.

2.7.1 Low Control

The Low frequency control can be used to improve the lower tones of speech, vocals or music. For best speech quality, the "SP" position is recommended as the initial setting - then adjust as necessary based on the acoustic conditions (indoors/outdoors, small/large room, reflective/non-reflective walls, few/many people, etc). In small, very reflective/resonant rooms, the Low control may have to be adjusted even lower than the "SP" position. For music the Low control should initially be set to the "0" position and then adjusted according to the room conditions and personal taste.

2.7.2 Mid Control

The Mid control is centered at a frequency of 1800 Hz and will have a pronounced effect on speech and vocal presence. It is also the frequency range where most feedback problems occur, so careful adjustment is recommended. For most situations, the "0" position is suggested as the initial setting, then adjust according to room conditions and desired presence level.

2.7.3 High Control

The High control can influence the clarity and intelligibility of speech and vocals but can also add sibilance or feedback if set too high. It is important to be directly in-line with the front of the loudspeaker cabinet when the High control is adjusted, so that the treble level or sibilance can be clearly heard. For most situations and with most microphones, it may be better to initially set the High control slightly below the "0" position, then adjust the Volume control to the maximum level that will be used - then make final (fine) adjustments with the High control.

2.8 Rechargeable Battery -Description

The internal rechargeable battery is a high quality, maintenance-free, lead battery. Unlike a car battery, it is leak-proof and can be oriented in any position without leaking. The main advantages of these batteries is their very high charge-capacity-to-volume ratio, very low tendency to self-discharge and low susceptibility to memory-effect (they can be recharged at any time / do not have to be completely discharged before they can be recharged).

Battery recharging is recommended after each prolonged use of the PAS400 with battery power.

See section 1.11 for additional information regarding battery charging, storage and estimated battery life.

2.9 Battery Replacement and Disposal

For safety and best performance, the internal rechargeable battery should only be replaced with a new unit of the manufacturer's recommended equivalent type. Defective batteries must be handled and disposed of as hazardous waste. Please contact the authorized K + H distributor or dealer before removing or disposing the internal battery.

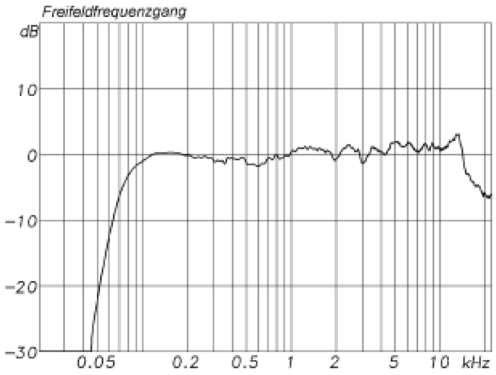
3 Troubleshooting

Problem:	Possible Cause:	Possible Solutions:
No sound	POWER switch in wrong position for Mic receivers	Set POWER switch (6) to Position I
	VOLUME controls set too low	Slowly turn up VOLUME controls (11, 14, 16 or 17)
	Internal battery is discharged	Connect to AC mains power and recharge battery
Sound is Distorted	Incorrect input level sensitivity for INPUT 1 or 2	Turn down VOLUME (11 or 14) and change the input sensitivity (10 or 13)
	Microphone is defective or battery in wireless mic is low	Replace mic or battery
PAS 400 switches Off	Battery is discharged	Connect to AC mains power and recharge battery
	Overheating from operation in a very warm environment / direct sun - especially when using full power or recharging battery	Reduce Volume levels (11, 14, 16 or 17), protect from direct sun and provide air cooling - or switch Off and wait until the unit has cooled down
Feedback	Microphone is an omnidirectional type	Use a cardioid or supercardioid mic
	Loudspeaker positioning in relation to microphones	Reposition loudspeakers so that they will not be aimed at any microphones
	Mic volume levels are too high	Turn down VOLUME (11 or 14)
	Recorder is connected both to INPUT 3 and to REC OUT	Turn VOLUME (3) down completely when recording
	TONE control(s) set too high	Turn down TONE controls (25, 24 or 23)
Loud crackle or popping noise	Defective microphone cable	Replace mic cable
	Defective connector(s) on microphone cable	Wiggle connectors to determine which one is defective - replace mic cable or install new connector
	Defective microphone	Replace microphone

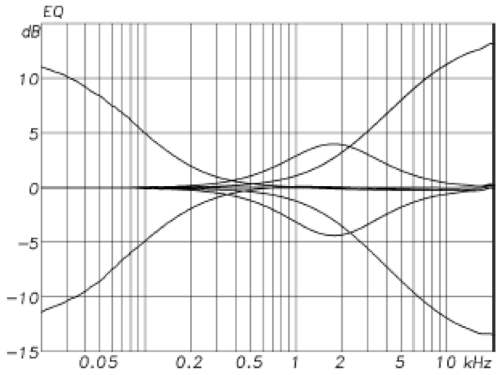
4 Performance Curves

The excellent acoustic performance of the freePORT PAS 400 can not only be heard, but also confirmed through close examination of the measurement results. The following performance curves are only a sample of these measurements.

The frequency response and the tone controls were especially tailored for the applications that are typical for small PA loudspeaker systems:

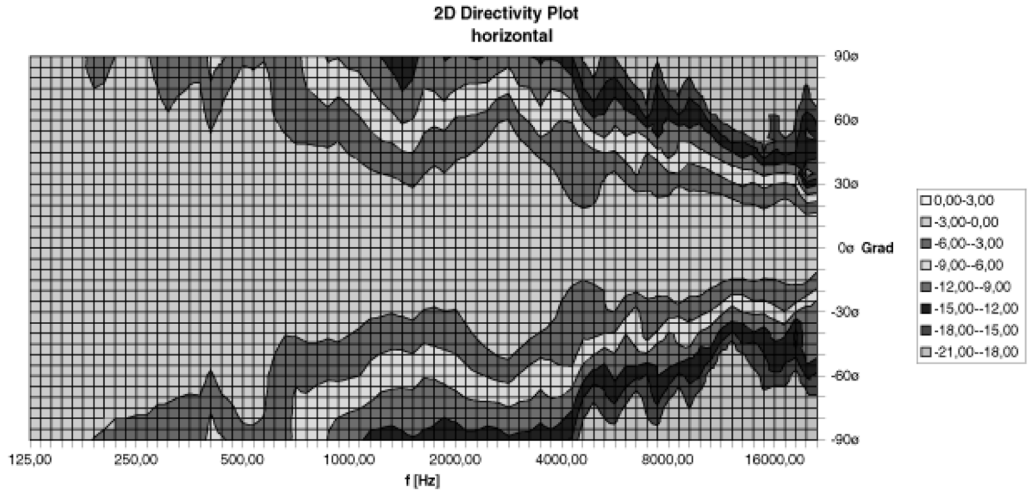


Free-Field Frequency Response



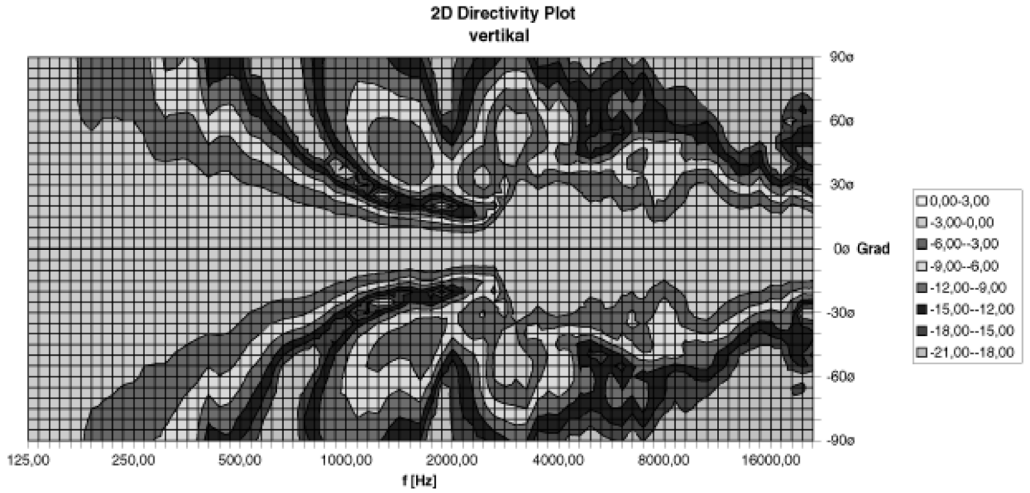
Tone Control Equalization (EQ) Curves

The outstanding horizontal directivity is demonstrated by the following diagram:



Horizontal directivity - freePORT PAS 400

The well-controlled vertical directivity is shown in the following diagram:



Vertical directivity - freePORT PAS 400

5 Product Specifications

Principal Active 2-way loudspeaker system with 2 x 6.5 in. woofers, 1 in. horn-loaded tweeter, internal electronic crossover and separate power amplifiers for each loudspeaker driver. The system can be powered by either AC mains, internal rechargeable battery (recharging system is built-in) or from an external 12 VDC source.

The system includes

- a built-in mixer-preamplifier with 4 input channels for connecting balanced/unbalanced, line level/mic level and wireless/cabled signal sources.
- three outputs: Line (line level balanced), Record (line level unbalanced) and Monitor (15 W @4 Ω)

Frequency Response	80 Hz - 15 kHz ±3 dB
Total Harmonic Distortion	<1% THD above 150 Hz at 100 dBspl / 1 m
Maximum Sound Pressure Level	105 dBspl in full-space, above 150 Hz at 3% THD 113 dBspl for speech with bass control set at minimum level
Loudspeakers	
Woofer	2 x 6.5 in.
Tweeter	1 in. horn loaded
Cabinet	
Material	Birch plywood
Finish	Charcoal grey (RAL 7021) textured, or optional speckled
Grille	Acoustic foam, removable
Electronics:	
Power Output	
Woofer Amplifier	50 Watts cont / 65 Watts max at < 0.5% THD
Tweeter Amplifier	15 Watts cont / 20 Watts max at < 0.5% THD
Monitor Amplifier	15 Watts cont / 20 Watts max at < 0.5% THD
Active Crossover	
Crossover frequency / slope	3 kHz at 24 dB/octave
Tone Controls	
High (Treble)	± 12 dB at 10 kHz
Mid (Midrange)	± 4 dB at 1.8 kHz
Low (Bass)	± 8 dB at 50 Hz
Sub-sonic filter (all inputs)	- 3 dB at 50 Hz, -6 dB/octave
Protection Circuits	
Woofer	Signal clipping detection limiter
Tweeter	Distortion detection / thermal limiter
INPUTS	
INPUT 1	Electrically balanced, XLR / TRS combo jack
	Selectable level: MIC (-45 dBu), AUX (-25 dBu), LINE (0 dBu)
	12 V phantom power in MIC and AUX positions
	12 dB headroom
INPUT 2	Transformer balanced, XLR / TRS combo jack
	Selectable level: MIC (-65 dBu), AUX (-25 dBu), LINE (+6 dBu)

	10 dB / 12 dB / 12 dB headroom
INPUT 3	Unbalanced, 2 x RCA jacks (summed to mono)
	-6 dBu
RF-RECEIVER INPUT	Transformer balanced
	-26 dBu
	Master volume for optional RF receivers (up to 4 Sennheiser Evolution Bodypacks, or 1 Sennheiser Evolution Diversity + 2 Sennheiser Evolution Bodypacks may be built in)
Outputs	
LINE OUT	Electrically balanced (transformer balanced optional), XLR male connector
	+6 dBu
REC OUT	Unbalanced, 2 x RCA jacks (dual mono)
	-6 dBu
MONITOR SPEAKER	15 / 20 Watts rms continuous / max into 4 Ω, ¼ in. phone jack
	Adjustable output
	4 Ω minimum load impedance, short-circuit protected
Indicators	
Power On	Red LED
Battery Charge Indicator	Green LED
Power Supplies	
AC mains	230 Volt AC / 50 Hz 120 Volt AC / 60 Hz 100 Volt AC / 50-60 Hz
Internal Battery	12 VDC (rechargeable from built-in charger)
External Battery	12 - 16 VDC
Power Consumption	
AC mains	160 VA max
External DC	6 Amps / 14 VDC
DC Out for External Equipment	
12 VDC	0.5 A, short-circuit protected, standard barrel connector
3, 6 or 9 VDC (user selectable)	0.5 A, short-circuit protected, standard barrel connector
Protection Class	Class 1, grounded chassis
Rechargeable Battery	
Type	Leak-proof, lead, maintenance free
Rating	12 V / 7.2 Ah
Battery Charging Circuit	
Description	From AC mains supply only: Constant current until fully charged then automatically switches to constant voltage trickle charge
Charging Time	For completely discharged battery:
	10 hours to 100% capacity
	6 hours to 90% capacity
Run Time in Battery Mode	With no external units connected to DC Out and no built-in RF receivers or Delay units operating:
	13 hours for low-level music

	6.5 hours for speech
	5.5 hours for loud music
Ambient Conditions	
Operating Temperature	+14 to +104 °F (-10 to +40 °C)
Storage Temperature	+5 to +104 °F (-15 to +40 °C)
Humidity	Not water resistant - do not expose to rain or excessive moisture. Optional LRH Rain Hood should be used but avoid exposure to high humidity or rain
Mounting: Attachment Points	
Bottom	standard 35 mm pole-mount flange
Sides	2 x M8 threaded sockets
Top	2 x M8 threaded sockets
Dimensions	
W x H x D	8.6 x 19.3 x 10.2 in. (218 x 490 x 260 mm)
Weight	
W/o RF-Receivers or Delay unit	34.1 lbs.(15.5 kg)
Accessories	
RF Receiver Mounting kits	- for 1 to 4 Sennheiser Evolution Bodypacks
	- for 1 Sennheiser Evolution Diversity + 2 Evolution Bodypacks
Digital Delay Mounting kit	- for 1 PDD 63 Delay Unit
Mounting Brackets	LH 26
Tripod Stand Adapter	LH 28
Tilt Connector / Tilt Adapter	LH 33 (0 - 15°) / LH 36 (o - 18°)
TV Spigot	LH 29
Eyebolt	C15
Spiked pole	LST 60
Telescope pole for tripod stand	SR 21
Rain Hood	LRH 100
Padded Carrying Case	LTR 100
Trolley	LRR 100

6 Warranty Information

All K + H products undergo an extensive procedure of quality control testing before leaving the factory. Before semiconductors are mounted on the circuit board, they are subject to rigorous tests. Every single unit is guaranteed to match its technical specifications within strict predetermined tolerances.

Please store the original carton in a safe, dry place. If warranty service is ever needed, put the unit into its original packing material and carton, together with a detailed description of the problem, and ship it (freight prepaid) to the K + H distributor or directly to:

K + H Vertriebs- und Entwicklungsgesellschaft mbH

Customer Service

Auf dem Kessellande 4a

30900 Wedemark

Germany

K + H warrants, that the product is free from any defects in both material and manufacturing and that it meets the specifications. A warranty issue can only be acknowledged when the complaint is received by the authorized K + H distributor or by K + H in writing within 8 days after delivery or detection of the fault. Not covered under this warranty are damages due to improper installation, operation, maintenance, handling, wear and tear, packaging or shipment.

The limitation period for warranty claims is described in the terms and conditions for K + H GmbH. It is K + H's option to repair, replace or to withdraw from the contract. In the event warranty service is required, presentation of a warranty card will not be necessary. Proof of purchase date can be made by filing copies of appropriate documents (invoice, delivery note).

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